

TAGUCHI METHOD IN BIOPROCESS ENGINEERING: *Case Studies*

►► *Editors:*

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Contents

PREFACE	vii
SYNOPSIS	ix
CHAPTER	
1 Introduction to Taguchi Method	1
<i>Maizirwan Mel, Najiah Nadir</i>	
2 Design of Experiments Using Taguchi's Approach	17
<i>Maizirwan Mel, Najiah Nadir</i>	
3 Taguchi Robust Design Creation by STATISTICA Software	31
<i>Maizirwan Mel, Najiah Nadir</i>	
4 Case Study 1: Process Improvement of Pharmaceutical Grade Ethanol Production	59
<i>Najiah Nadir, Maizirwan Mel, Mohd Ismail Abdul Karim, Rosli Mohd Yunus</i>	
5 Case Study 2: Process Optimization of Lactic Acid Production in Fermenter	75
<i>Maizirwan Mel, Mohd Ismail Abdul Karim, Parveen Jamal, Mohamad Ramlan Mohamed Salleh, Ruzi Aini Zakaria</i>	

6	Case Study 3: Optimization of Coenzyme Q10 Production in Bioreactor	89
	<i>Maizirwan Mel, Mohd Ismail Abdul Karim, Fairin Huda Faivdullah</i>	
7	Case Study 4: Improvement of Clarification and Separation Process for Hybridoma Cell Supernatant	103
	<i>Maizirwan Mel, Mohd Ismail Abd Karim, Faridah Yusuf, Dzun Noriani, Hamadah Mohd Nur Lubis</i>	
8	Taguchi on Quality Improvement	113
	<i>Maizirwan Mel, Najiah Nadir</i>	
9	Case Study 5: Analysis of Process Capability and Quality of Monoclonal Antibody Production in Bioreactor	133
	<i>Maizirwan Mel, Mohd Ismail Abdul Karim, Faridah Yusof</i>	
	References	143

Chapter 2

Design of Experiments Using Taguchi's Approach

Maizirwan Mel and Najiah Nadir

1. Overview

Design of Experiments (DOE) is a powerful statistical technique introduced by R. A. Fisher in England in the 1920's to study the effect of multiple variables simultaneously. In his early applications, Fisher wanted to find out how much rain, water, fertilizer, sunshine, etc. are needed to produce the best crop. Since that time, much development of the technique has taken place in the academic environment, but did help generate many applications in the production floor.

As a researcher in Electronic Control Laboratory in Japan, Dr. Genichi Taguchi carried out significant research with DOE techniques in the late 1940's. He spent considerable effort to make this experimental technique more user-friendly (easy to apply) and applied it to improve the quality of manufactured products. Dr. Taguchi's standardized version of DOE, popularly known as the Taguchi method or Taguchi approach, was introduced in the USA in the early 1980's. Today it is one of the most effective quality building tools used by engineers in all types of manufacturing activities.

The DOE using Taguchi approach can economically satisfy the needs of problem solving and product/process design optimization projects. By learning and applying this technique, engineers, scientists, and researchers can significantly reduce the time required for experimental investigations. DOE can be highly effective when you wish to: